

REMARKS

Claims 1-13, 17, 18, 20-35, 38, and 39 are pending in the present application. In the Office Action mailed December 6, 2006, the Examiner rejected claims 1-4 and 10 under 35 U.S.C. §103(a) as being unpatentable over Wan et al. (USP 6,984,978). The Examiner next rejected claims 21-23, 29, and 31 under 35 U.S.C. §103(a) as being unpatentable over Wan et al.

Claims 5-9, 13, 17, 18, 20, 32-35, 38, and 39 were withdrawn from consideration by the Examiner.

Claims 11 and 12 were objected to by the Examiner because of informalities. The Examiner stated that “[i]n claims 11-12, ‘the plurality of windings’ has not been recited previously, therefore this term is indefinite.” *Office Action*, December 6, 2006, p. 2. Applicant has amended claims 11 and 12 to address the Examiner’s concerns. As amended, Applicant believes that claims 11 and 12 are in condition for allowance.

Claims 24-27 were indicated as containing allowable subject matter. Such indication is appreciated.

The Examiner rejected claim 1 under 35 U.S.C. § 103(a) over Wan et al., stating that Wan et al. discloses a current measurement apparatus having a conductive path (48) proximate to a printed circuit board, first and second Hall effect sensors (10) that can be mounted to the PC board adjacent the conductive path to determine current flow, and a processing component to receive feedback from the first and second hall effect sensors. The Examiner admitted that “Wan et al. do not disclose a printed circuit board includes (sic) a first and second arms for mounting the first and second Hall effect sensors”, but asserted that “Wan et al. teach that a housing (80) having first and second arms (84, 86) for receiving the first and second Hall effect sensors (10)” and that “[i]t would have been obvious for one of ordinary skill in the art to provide first and second two arms [on a PC board] so that the first and second hall effect sensors are secured properly on the board in order to perform the current measurement accurately.” *Office Action*, December 6, 2006, p. 3. Applicant respectfully disagrees. Specifically, Applicant believes that Wan et al. fails to teach, disclose, or suggest all of the elements called for in claim 1.

Claim 1 calls for a current sensor having first and second Hall effect sensors constructed to provide feedback indicating current flow through a conductor susceptible to external magnetic flux and a housing configured to position the first second Hall effect sensors about the conductor to provide generally magnitude equal feedback of current flow through the conductor and generally polarity opposite feedback of the external magnetic flux. Claim 1 also calls for a

printed circuit (PC) board having a pair of PC board fingers configured to receive the first Hall effect sensor and the second Hall effect sensor.

As shown in Fig. 7 of the current application, current sensing system 170 includes a PC board 172 having a pair of PC board fingers thereon. A pair of Hall effect sensors 174, 176 are mounted on the PC board and configured according to an anti-differential topology and adjacent to a conductor, which is formed into spiral coils 178, 180. *Application*, ¶70. A housing 184 is also included in the system, the housing having two portions 186, 188 that, when joined, engage PC board 172 to properly position and secure components, such as the Hall effect sensors 174, 176, against dislodgement and movement. *Application*, ¶71.

Wan et al. discloses a device for sensing magnetic fields. The device includes magnetic field sensors 10 positioned about a conductor 48 in a perpendicular relationship therewith. The sensors 10 can be fixed to a printed wiring board with conductor 48 located therebetween. Wan et al. also discloses that a current measurement apparatus 80 formed of non-conductive molded material can be used to position sensors 10. As shown in Fig. 4 of Wan et al., current measurement apparatus 80 includes a housing having lower portion 82, a first leg 84, and a second leg 86. Sensors 10 are mounted in the first and second legs and conductor 48 is positioned within the C-shaped clamp formed by the legs. However, as admitted by the Examiner, Wan et al. fails to teach or suggest a PC board having a pair of fingers to receive first and second Hall effect sensors as called for in claim 1. That is, the Examiner recognized that the current measurement apparatus 80, and the portions 82, 84, 86 that comprise the apparatus, are not part of a PC board, and therefore, no PC board having a pair of PC board fingers are taught or suggested in Wan et al. The Examiner asserted that it would have been obvious to one skilled in the art to provide first and second arms 84, 86 as taught in figure 4 of Wan et al. to a PC board to secure the sensors 10 in the device of Wan et al. In making this assertion, the Examiner uses both improper hindsight and the teaching of the present invention to assert that it would have been obvious to one skilled in the art to modify the teachings of Wan et al. to achieve the current invention. Such motivation is improper, as there must be some reason for the [modification] other than the hindsight gained from the invention itself...." *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Even assuming *arguendo* that there is motivation to modify Wan et al. to implement the design of current measurement apparatus 80 into the PC board, which there is not, Wan et al. still would not teach or suggest a PC board having a pair of PC board fingers and a separate housing to position the Hall effect sensors within the PC board fingers as is called for in claim 1. That is,

claim 1 calls for two separate elements, the PC board fingers and a housing, for receiving and positioning the Hall effect sensors. Were the current measurement apparatus 80 of Wan et al. and its first and second legs 84, 86 formed as part of the PC board, then there is no teaching of a separate housing being included in Wan et al. to further secure and position the magnetic field sensors 10. As such, even were the current measurement apparatus 80 of Wan et al. formed as part of a PC board to receive sensors 10, the cited reference still fails to teach or suggest that which is called for in claim 1. As such, claim 1 and the claims dependent therefrom are patentably distinct over Wan et al.

The Examiner also rejected claim 21 under 35 U.S.C. § 103(a) as being obvious over Wan et al. Claim 21 calls for, in part, a current sensor having a PC board, a conductive path disposed proximate to the PC board, and first and second Hall effect sensors mounted to the PC board adjacent to the conductive path. Claim 21 also calls for the conductive path to include at least one spiraled portion configured to encircle at least a portion of the PC board. In making the rejection, the Examiner stated that “Wan et al does not disclose the conductive path includes (sic) at least one spiraled portion configured to encircle at least a portion of the PC board.” *Office Action*, supra at p. 4-5. Because of the failure of Wan et al. to teach or suggest a conductive path having a spiraled portion to encircle a part of the PC board, the Examiner then cited to Duhashi et al. for teaching that it would have been well known to have a conductor that encircles at least a portion of a PC board, stating that “[i]t would have been an obvious design choice for one of ordinary skill in the art to have the conductor path (48) Wan et al with a different shape portion as taught by Duhashi et al since the criticality of this feature has not been established by Applicants.” *Id.* First, Applicant would point out that the Examiner rejected claim 21 under 103(a) only over Wan et al. The rejection did not cite to Duhashi et al. (USP 6,819,095). As such, if the Examiner is in fact relying in part upon Duhashi et al. for the rejection of claim 21 under 103(a), Applicant requests clarification of such in a next non-final Office Action. Irregardless of this, even were the teachings of Duhashi et al. to be combined with Wan et al., the combination would still fail to teach or suggest that which is called for in claim 21, as Duhashi et al. also fails to teach a conductor having a spiraled portion surrounding at least a portion of a PC board. That is, Duhashi et al. merely teaches an L-shaped conductor 30 that does not “surround” a portion of the printed circuit board (PCB) as called for in claim 21. *See Duhashi et al.*, Fig. 3.

Furthermore, Applicant also strenuously disagrees with the Examiner’s statement that the criticality of the conductor having a spiraled portion, as called for in claim 21, has not been established. The Examiner stated that “the shape of the conductor is not given patentable weight”

and cited to *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) for support, which is cited in MPEP 2144.04. MPEP 2144 states that “if the facts of a prior legal decision are sufficiently similar to those in an application under examination, the Examiner may use rationale used by the court.” Here the Examiner cited specifically to the decision of *In re Dailey*, in which the court held that the configuration of a claimed element in the application “was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed [element] was significant.” The Examiner asserted that the spiral coil shape of the conductor called for in claim 21 should not be given patentable weight because, as set forth in *In re Dailey*, the shape of the conductor is “a matter of choice.” Such a position is in contradiction to the Examiner’s previous requirement for restriction imposed on the claims of the current invention. That is, the Examiner has previously given weight to the shape of the conductive path by stating that “a conductive path including at least one spiraled portion configured to encircle at least a portion of the pc board” was a basis for restriction between Figs 4, 5, and 7. See *Office Action*, March 29, 2006, p. 2. Furthermore, were the shape of conductor not given any patentable weight, then claim 21 should be found to be generic, which would entitle Applicant to consideration of additional species. As such, if the Examiner continues to assert that no patentable weight should be give to the spiral shape of the conductor, as called for in claim 21, then the Examiner must also rejoin all of the pending claims.

Despite the Examiner’s assertion to the contrary, reasons for the spiral shape are set forth in the specification. That is, the present application sets forth the benefits of the conductor having at least one spiraled portion to encircle at least a portion of the PC board, as called for in claim 21. As shown in Fig. 5 of the present invention, a current sensing system 110 includes a PC board 112 having a first finger 114 and a second finger 116 configured to receive magnetic flux sensors 120, 122. *Application*, ¶61. A conductor in current sensing system 110 includes conductive coils 130, 132 that surround the fingers 114, 116 of the PC board 112. *Application*, ¶63. The coils 130, 132 of the conductor spiral in opposite directions to provide magnetic fluxes from each coil that are substantially opposite to one, which substantially cancels detection of externally induced magnetic fields and concentrates a detectable magnetic flux within the coils. *Application*, ¶63-64. That is, the spiraled shape of coils 130, 132 surround fingers 114, 116 and magnetic flux sensors 120, 122 to provide the benefit of concentrating a detectable magnetic flux within the coils and eliminating external magnetic fields. As such, the benefits of the spiraled shape are demonstrated in the present application per the guidelines set forth in MPEP 2144.04 and *In re Dailey*, to show that the spiraled shape called for in claim 21 should be given patentable

weight. In light of the above, claim 21 and the claims dependent therefrom are patentably distinct over Wan et al.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-4, 10-13, and 21-31.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,

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¹The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-2623. Should no proper payment be enclosed herewith, as by credit card authorization being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-2623. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extensions under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-2623. Please consider this a general authorization to charge any fee that is due in this case, if not otherwise timely paid, to Deposit Account No. 50-2623.